Specifications

HD-PLC Ethernet Adaptor

Power Line Communication Interface	
Standard	HD-PLC
Actual transmission speed*1	UDP: Max. 70 Mbps TCP*2: Max. 42 Mbps
Maximum recommended no. of adaptors per network*3	16 (including the Master)
Maximum recommended no. of network devices connected to each adaptor*4	8

LAN Interface	
Standard	IEEE 802.3/IEEE 802.3u
Interface	10 Base-T 100 Base-TX Auto MDI/MDI-X
Protocol	IPv4, IPv6, TCP, UDP
Access method	CSMA/CD

General	
Operational environment	0–40℃ (32–104°F) 20%–85% humidity (without condensation)
Dimensions (W x D x H)	Approx. 121 mm x 40 mm x 70 mm (4 3/4″ x 1 9/16″ x 2 3/4″)
Weight	240 g (0.53 lb.)
Power supply	Input 120 V AC (USA) 100-240 V AC (Others)
Power consumption	4 W

HD-PLC Interface

HD-PLC Interface	
Frequency band	4–28 MHz
Modulation	Wavelet OFDM (16 PAM–2 PAM)
Transmission PHY rate	Max. 190 Mbps*5
Access method	CSMA/CA TDMA*6
Error correction	Reed-Solomon encoder/decoder Convolutional encoder/Viterbi decoder
Encryption	AES 128-bit encryption
Communication distance	Approx. 150 m (490 ft.)*7

*1 Results may vary depending on electrical conditions, network environment, and other factors. For information on how transmission speed is measured, access the Panasonic PLC Support Site at: http://panasonic.co.jp/pcc/products/en/plc/
*2 Using Linux FTP.
*3 Performance may be affected as more adaptors are added to the network.
*4 Connecting more network devices to an adaptor may increase network traffic and affect performance.
*5 This is the theoretical maximum data transmission speed of the HD-PLC standard.
*6 The HD-PA100 does not support TDMA.
*7 Varies depending on the electrical environment.

Part Names

Mode Selector

AC IN

Factory Default Reset Button

LAN Jack

Setup Button
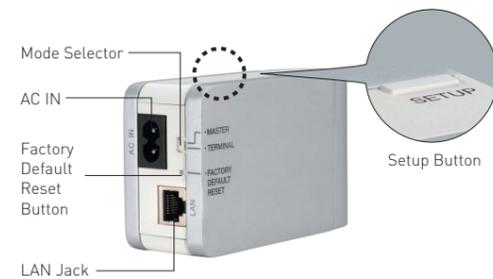
Mode Selector
The position of this selector during registration determines whether the adaptor is used as the Master or as a Terminal.

AC IN
Connects the adaptor to AC power as well as to the HD-PLC network.

Factory Default Reset Button
Used to reset the adaptor and erase its registration.

LAN Jack
Connects the adaptor to a network device, such as a broadband router,hub,computer, etc.

Setup Button
Used to register the adaptor or test the terminal's network speed.

Recommended Connection | We recommend plugging the adaptor directly into a wall outlet whenever possible.

⭕ Recommended

Direct connection to the wall outlet, with other loads connected via a noise filter power strip.

Outlet   AC Adaptor   Charger

Noise filter power strip

PC

BL-PA100
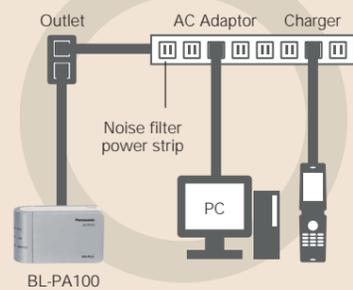
❌ Not Recommended

Battery chargers (including cell phone chargers) and other devices, when they are connected to the same power outlet.

Outlet   BL-PA100

AC adaptor or charger

or   PC
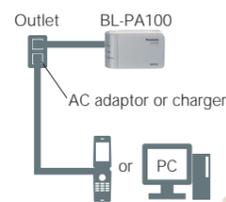
Connection to a power strip with noise filter.

Noise filter power strip

Outlet

BL-PA100
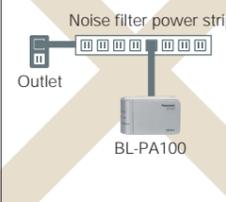
Connection to a power outlet with multiple loads.

AC adaptor or charger

Outlet

BL-PA100

PC
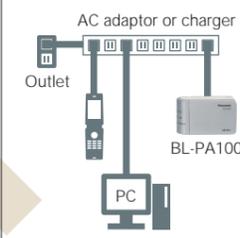
*If the following kinds of electrical appliances are located near the PA100 Master or PA100 Terminal, or the following connections are used, the signal may be obstructed and the transmission speed may be reduced: vacuum cleaners, dryers, electric drills, and other appliances with electric motors (only when the appliances are being operated); lighting equipment such as touch-sensor lights and halogen dimmer lights, or compact battery chargers for cell phones and other devices (when they are connected to the same power outlet as the PA100); connection of the PA100 to a power outlet with multiple loads, or to a power strip; or transmission to extremely distant rooms.

Panasonic
ideas for life

BL-PA100
BL-PA100KT*

*Set of two BL-PA100s

PLC
LAN
MASTER

Panasonic
BL-PA100

PLC
LAN
MASTER

HD-PLC

The next step in home network
convenience

Panasonic®

http://panasonic.co.jp/pcc/products/en/plc/

0M0606SP-PA100-LT.CE
All pictures simulated.
Design and specifications are subject to change without notice.

HD-PLC

HD-PLC

Introducing the Super-Easy Home Network System

The new HD-PLC Ethernet Adaptor makes an exciting breakthrough in home network systems. It brings true satisfaction by solving the problems of slow data transmission, difficult settings, insufficient safety, and limited applications. Using just the ordinary power outlets in your home, Panasonic's HD-PLC Ethernet Adaptor will let you easily enjoy the world of the Internet.

Panasonic
BL-PA100

PLC
LAN
MASTER

Panasonic
BL-PA100

PLC
LAN
MASTER

HD-PLC

PLC Operating Principle

Power Line Communication (PLC) is a technology that uses power lines to both supply electric power and transmit data. Electricity travels in large, slowly changing waves (figure A), while data signals move in small, quickly changing waves (figure B). Since these waves travel at different speeds, there is no mutual interference when they travel together (figure C). This makes it possible to send data signals through power lines, and access the Internet from power outlets. Original Panasonic HD technology uses this principle to provide the large data transmission capacity and high speed of the HD-PLC Ethernet Adaptor.

Figure A
Electricity (Hz)
Voltage
Time

Converter

Electric power meter

Service line

Distribution panel

PLC Adaptor
Outlet
IP phone

Internet

Optical fiber

Router

PC

TV

PLC Adaptor

Figure B
Data signal (MHz)
Voltage
Time

Figure C (Figure A + Figure B)
The two signals are combined.
Voltage
Time
Electricity + Data signal

The overlapping electrical and data signals are divided and extracted.

Everyone Smiles with the HD-PLC Ethernet Adaptor

Excellent Utility 1
It uses ordinary power outlets. You can connect to the Internet* from any room that has an outlet.
*A broadband service subscription is required.

Easy Set-up 2
No complicated settings. You don't even need to use a PC to set-up the HD-PLC Ethernet Adaptor.

High-Speed Communication 3
A theoretical maximum communication speed of 190 Mbps lets you enjoy movies, music, and more with ease.

Economy 4
Very economical. No need to pay a lot of money for a house LAN system, and no expensive cables to buy.

High Reliability 5
Superb security functions greatly boost reliability, while keeping the set-up fast and easy.
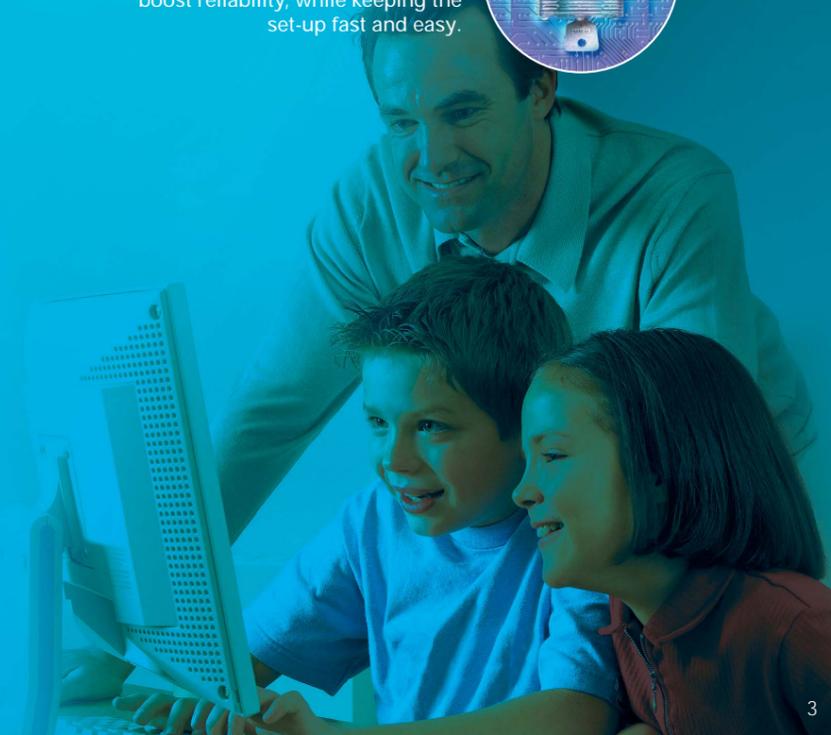
Great Features for Enhancing Home Entertainment

1 Excellent Utility | Can be used anywhere that has a power outlet.

The HD-PLC Ethernet Adaptor turns every power outlet in the house into an Internet access point. Just like plugging an electric cord into the outlet, you insert the

HD-PLC Ethernet Adaptor plug and you're ready to log on to the Internet. It's a super-easy home network, with no need for complicated cables.

PC
BL-PA100 (Terminal)
Outlet
Electrical wiring
Outlet
Outlet
BL-PA100 (Master)
PC
BL-PA100 (Terminal)
Internet
Modem/Router
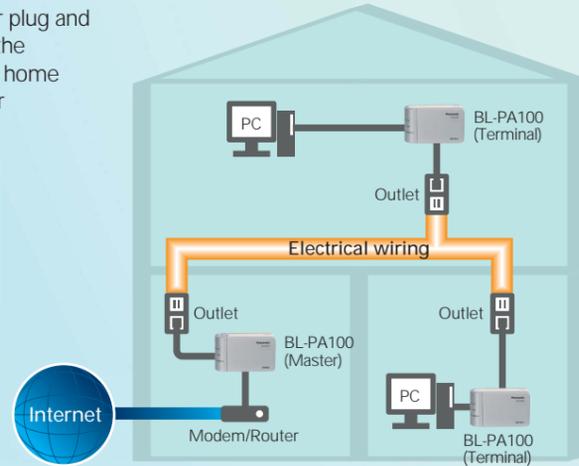
2 Easy Set-up — No PC Required | Settings are easy for anybody to make.

There's no tricky installation or complicated settings. Just take the BL-PA100KT[*1] out of the box and plug it into the power outlet. Set up the other equipment on the network, such as routers and PCs, as described in their respective instructions. Adding more HD-PLC Ethernet Adaptors[*2] is easy too, using the quick 3-step procedure shown here.

[*1] Contains a set of two BL-PA100 units. One HD-PLC Ethernet Adaptor can be set as the Master unit, and individual Terminal units can be registered. One of the BL-PA100KT units is set as a Master unit and the other is set as a Terminal unit when they are shipped from the factory. [*2] BL-PA100

■Adding more HD-PLC adaptors

1. Plug it in
Plug the Master and Terminal units into the same power outlet.
Master
Terminal
AC

2. Push two buttons
Push the Setup button on each unit.
SETUP
PUSH
Master/Terminal

3. Watch it light up
The PLC lamp lights up to show that set-up is complete. You can move the units anywhere you want to go online at home.
Master CHECK
PLC
Terminal CHECK
PLC

3 High-Speed Communication | Fast, comfortable communication of high-volume data.

Fast, comfortable communication of high-volume data. At a theoretical maximum transmission speed of 190 Mbps, the system is faster than a wireless LAN system, even when comparing actual system speeds. Also, a simple speed measurement function[*1] shows the communication speed between Master and Terminal units.[*2] The speed is measured by simply pressing a button on the Terminal, so you can easily find which power outlets give you the highest communication speed for a

more comfortable network environment. You no longer have to feel frustrated because of slow data transmission.

[*1] The indicated speed is only valid for the moment at which it was measured. It does not imply that the indicated speed will continue.
[*2] It does not indicate the communications speed between Terminals.

PLC
LAN
MASTER
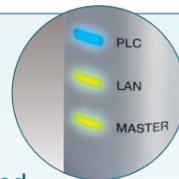
■Refer to the chart below to determine the network speed.

Front panel		No link	Good Less than 10 Mbps[*3]	Better 10 Mbps to 30 Mbps[*3]	Best More than 30 Mbps[*3]
	PLC				
	LAN				
	Master				
Network speed		No link	Good Less than 10 Mbps[*3]	Better 10 Mbps to 30 Mbps[*3]	Best More than 30 Mbps[*3]

[*3] Approximate data transmission speed when transmitting data using the UDP protocol.

4 Economy — No Wiring Needed | No need to drill holes in the wall or use unsightly cables.

No need to drill holes in the wall or use unsightly cables. Because you can use your existing electrical wiring and power outlets, you save the expense of wiring. You also don't need to extend any cable

modem or router cables to your PC, so there is no need to drill holes or run cables along the floor or wall. In addition to being economical, this preserves the room's appearance.

■Unattractive wall with cables
Without HD-PLC Adaptor
LAN cables must be used for connection.The unsightly cables ruin the appearance of the room.

■Neat wall without cables
With HD-PLC Adaptor
There is no need to route cables, and it is economical. The room also looks neat without any cables in sight.

5 High Reliability | Superb security features without complicated settings.

The HD-PLC Ethernet Adaptor comes standard with AES* 128-bit encryption, and the security settings are made automatically without any need for a PC. This easy set-up ensures a high level of safety and no setting mistakes. Also, because it uses household power outlets, data communication is not blocked by obstacles like

walls as it is with wireless LAN systems, so you enjoy smooth and easy network communication.

*AES stands for Advanced Encryption Standard. It is a next-generation encryption standard approved in 2001 by the National Institute for Standards and Technology (NIST), an organization under the U.S. Department of Commerce, as a standard encryption technique to be adopted by the U.S. government. Vulnerabilities discovered in the previous DES (Data Encryption Standard) were eliminated in AES.
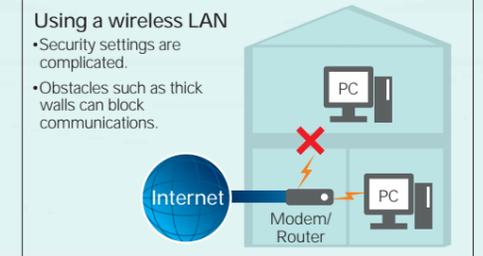
Using a wireless LAN
•Security settings are complicated.
•Obstacles such as thick walls can block communications.
PC
Internet
Modem/Router
PC

Panasonic HD-PLC Features

HD-PLC is a proprietary Panasonic technology that enables high-speed, high-quality, stable data transmission.

■Bandwidth of AC Power Line Signals
AC Power Supply
Lower-Speed PLC
High-Speed PLC HD-PLC*
50/60 Hz
<500 kHz
2 MHz~30 MHz
*HD-PLC uses the 4- to 28-MHz range in this frequency band.
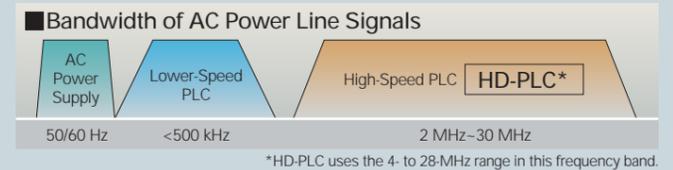
Wavelet OFDM System
The HD-PLC PHY (physical layer) uses Wavelet OFDM (Orthogonal Frequency Division Multiplexing) technology to achieve highly efficient transmission with characteristics that exceed even FFT (Fast Fourier Transform)-based OFDM systems. Wavelet OFDM features greater speed efficiency and forms a deeper "flexible notch" that prevents interference with shortwave and other broadcasts. This is achieved by appropriately modulating the sub-carrier and by including no guard interval.

■FFT-Based OFDM Spectrum
Magnitude (dB)
Frequency (MHz)

■Wavelet OFDM Spectrum
-13dB
Deeper Notch
-35dB
Magnitude (dB)
Frequency (MHz)
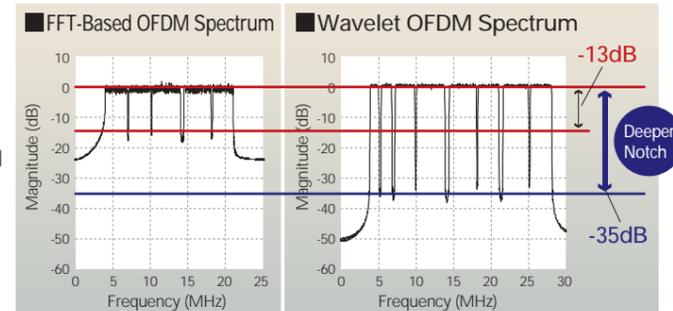
Stable Data Communication Performance
The BL-PA100 quickly detects fluctuations in the data transmission path caused by noise and other factors, and determines the optimal data transmission method to enable maximum throughput at that point in time and achieve stable communication performance. Strong error correction coding and a diversity mode also boost reliability in poor-quality home power lines.

■Quick Response for Optimizing Data Transfer when Conditions Change
Ⓐ Quickly finds maximum transmission rate
Ⓑ Quickly resumes communications
Speed (Mbps)
Time (sec)
Dryer ON (30 sec)
Dryer ON (30 sec)
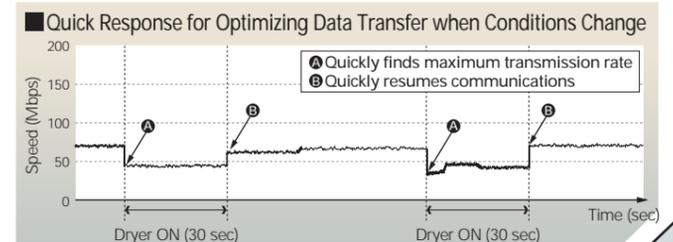
Enjoy Expanded Data Communications, Easy Image and Sound Distribution, and Greater Security

With the HD-PLC Ethernet Adaptor, Panasonic opens the door to a truly ubiquitous home network system.

The age of ubiquitous networking continues to evolve. As a core for the ubiquitous home network, Panasonic recommends a network system based on the HD-PLC Ethernet Adaptor. Going beyond the simple enjoyment of Internet use or a home LAN system, this opens the door to IP communications as well as the free exchange of images and sounds with a high level of security overall. It also lays the groundwork for a total home network system that will let you control your home appliances with your cell phone from just about anywhere. You can look forward to a whole new lifestyle with Panasonic's HD-PLC Ethernet Adaptor.

1. IP-Home Security

The HD-PLC Ethernet Adaptor can be combined with network cameras to create a home security system or to watch over the family by monitoring the camera images.

A Combine with a network camera and door phone to check on visitors before opening the door.

B Install a network camera in the garage to prevent car theft.

C Watch your child sleep in the bedroom while you are in the living room.

2. IP-Audio Listening

While listening to Internet-distributed music in your own room, download the songs you like and send them to your mother on another floor of the house.

3. IP-Communication

In addition to PC information and data, you can install an IP telephone and talk with distant family or friends at very low cost.

4. IP-Game Playing

Parents and children can play Internet games together. You can also compete with your family in different rooms.

5. IP-TV Viewing

Enjoy TVs and movies distributed over the Internet.

A You can watch HD programmes.

B Move your PC into the kitchen and watch cooking programs while you cook.

C You can watch HD programmes in two places simultaneously.

6. IP-Mobile Control

You can check the conditions back home while you are away to make sure everything is safe. In the near future, home appliances will be equipped with a PLC module so you can control the air conditioner and see what's inside your refrigerator from outside the house.

Bedroom
Child's room
Child's room
Bedroom
Bathroom

2F

Panasonic
BL-PA100
PLC
LAN
MASTER
HD-PLC

Kitchen
Dining room
Living room
Garage
Entrance

1F

6

7